DREDGED MATERIAL RESEARCH PROGRAM

CONTRACT REPORT D-76-4

TECHNIQUES FOR REDUCING TURBIDITY ASSOCIATED WITH PRESENT DREDGING PROCEDURES AND OPERATIONS

by

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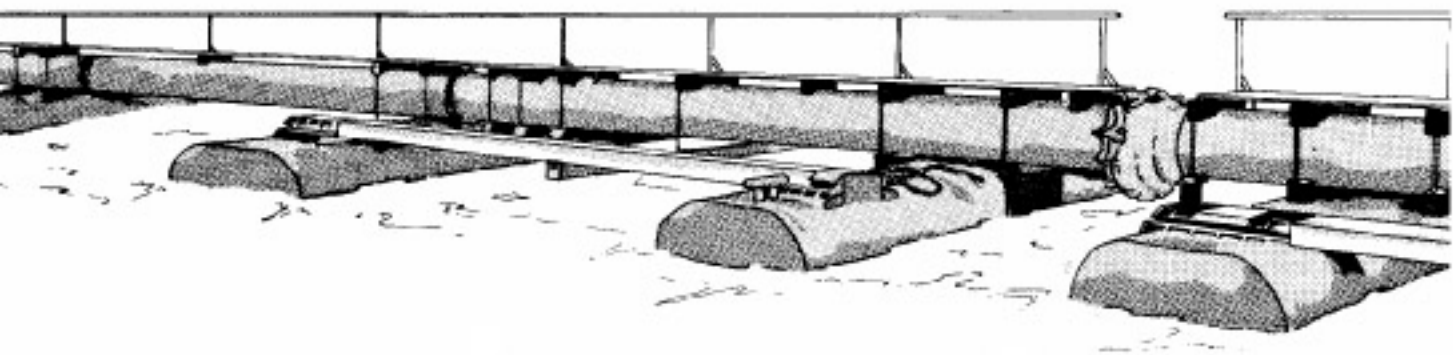
Final Report



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SUBJECT: Transmittal of Technical Report D-76-4

TO: All Report Recipients

1. The contract report transmitted herewith represents the results of one research effort (Work Unit) initiated as part of Task 6C (Turbidity Prediction and Control Research) of the Corps of Engineers Dredged Material Research Program (DMRP). Task 6C, included as part of the Disposal Operations Project of the DMRP, is concerned with investigating the problem of turbidity and developing methods to predict the nature, extent, and duration of turbidity around dredging and disposal operations. Equal emphasis is also placed on evaluating both chemical and physical methods for controlling turbidity generation around dredging and disposal operations.

2. Although there are still many questions about the direct and indirect effects of different levels of turbidity on water quality and different aquatic organisms, turbidity generated by dredging and disposal operations can be aesthetically displeasing. Regardless of the ecological effects associated with turbidity, high levels of turbidity generated by both dredging and disposal operations must be controlled where such control measures are deemed necessary. In addition, the development of a capability to predict levels of turbidity that might be generated by a dredging and/or disposal operation should provide a means for evaluating the necessity for different control measures. An assessment of the effectiveness of different control measures and their impact on the dredging operation itself will indicate the range of applicability of a particular method of turbidity control under various environmental conditions.

3. This particular study was concerned with operational techniques that could be used with existing dredging equipment and the proper application of existing technology and equipment to reduce the amount of turbidity generated by a dredging operation while maintaining acceptable dredging efficiency. These techniques were assessed in light of their turbidity reduction potential, cost, effect on production, and ease of implementation. The guidelines presented in this study are certainly not revolutionary in their scope and will not eliminate all turbidity in the vicinity of a dredging operation; however, the report does represent a

synthesis of information on possible techniques for reducing turbidity based on the knowledge and experience of the authors and others associated with the dredging industry. In addition, a low level field effort was undertaken to determine if there is any correlation between the degree of turbidity generation and cutter revolution rate. Due to various field problems and inadequacies in the experimental design, the test results must be interpreted very qualitatively.

4. This study addresses the practical operational and engineering aspects of dredging and represents the first of a series of reports on possible measures that might be used to control turbidity. Subsequent work will provide information on flocculants, silt curtains, and submerged pipeline discharge.

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Colonel, Corps of Engineers
Director

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Techniques for reducing turbidity associated with present dredging procedures and operations fall principally in the categories of the cutter, ladder, suction, hull, pipeline, connections, barges, tenders, personnel, inspection, contracts, plans, and specifications. These techniques consist principally of good dredging procedures already known but not always followed by dredging contractors and their personnel. When these techniques are consistently applied, not only will dredge-induced turbidity be reduced, but (Continued)

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20. ABSTRACT (Continued)

economical operation will prevail in most instances. Other techniques for reducing dredge-induced turbidity tend to increase dredging costs and should be used only when necessary. Dredge-induced turbidity is normally apparent only in the immediate vicinity of the dredge plant and the levels of this turbidity are not usually as high as those created by open-water disposal of the dredged material. In addition to applying good dredging techniques to reduce turbidity, better inspection is needed on Corps of Engineers (CE) and CE-related projects. More CE supervision of dredging operations needs to be implemented. More training is required for inspectors, whether CE or private-company personnel. Consideration should be given to a nationwide school or short courses where dredge personnel could obtain basic technical knowledge of dredging. Contracts should clearly and uniformly specify requirements for turbidity-reduction measures and measurements. Contracts should be written to include smaller dredges. Where turbidity is a problem, dredging should be accomplished when natural background levels of turbidity are high.